REMARKS

Claims 15, 16 and 22 have been canceled, and new claims 28-34 have been added. No new matter was added. Thus, claims 1, 2, 9, 13, 14, 17-21 and 23-34 are pending. Independent claims 1, 2 and 9 have been amended to distinguish over the prior art of record, and new claims 28-34 provide additional limitations to further distinguish over the prior art of record. Accordingly, Applicants respectfully submit that the present application is in condition for allowance.

I. Claim Amendments

The claims of the present application have been amended, and Applicants respectfully submit that no new matter was added to the claims, as amended.

The subject matter added to claims 1, 2 and 9 is disclosed by former claims 15, 16 and 22 and by the specification of the present application, as filed, on page 8, lines 6-8, and page 9, line 25.

The subject matter of new claims 28 and 32-24 is disclosed in the specification of the present application, as filed, on page 7, lines 4-6, and page 9, lines 10-11.

The subject matter of new claims 29-31 is disclosed in the specification of the present application, as filed, on page 8, line 18, to page 9, line 3.

Reconsideration of each of claims 1, 2, 9, 13, 14, 17-21 and 23-34 is respectfully requested.

II. Claim Rejections – 35 USC §112, first paragraph

> *In the non-final Office Action dated June 11, 2008, claims 17-19 and 23-25 are rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement because "the specification does not reasonably describe the types of impurities (excluding gas impurities) to which the instant claims are drawn".*

For the reasons recited below, Applicants respectfully request reconsideration and removal of the 35 USC §112, first paragraph, rejection of claims 17-19 and 23-25. Applicants respectfully submit that these claims are in full compliance with 35 USC §112, first paragraph, and that the specification does reasonable describe to one of ordinary skill in the art the types of impurities to which the claims are drawn.

Claims 17-19 and 23-25 recite limitations with respect to the amount of impurity content contained by the iron silicide powder. One of ordinary skill in the art would clearly recognize that Fe and Si are not impurities. For example, see the present application, as filed, on page 7, line 4-6, and page 9, lines 10-11. In addition, these claims specifically state that the amount of impurity content does not include gas components. The term "gas components" is clearly defined on page 7, lines 20-22, of the present application, as filed. Accordingly, one of ordinary skill in the art would recognize that any chemical element other than Fe, Si, and gas components of elements, would be considered the impurity referred to in claims 17-19 and 23-25 of the present application.

In addition, the present application discloses a method of producing the powder with low impurity level. For example, on page 8, lines 18-26, the present application discloses that iron raw material of a purity of 3N (99.9%) is subject to a wet refining process to remove impurities. The "wet refining process" is disclosed as being, for example, a process using a combination of ion exchange membrane, solvent extraction, organometallic complex decomposition, electrolytic

refining, and the like techniques. The stated purpose of these steps is to refine the purity level of the iron raw material to 5N (99.999%) before proceeding to the next process step.

Further, the application discloses that this 5N purity iron raw material is used to produce a "high purity iron salt solution" which is dried and roasted to produce high purity iron oxide (Fe_2O_3) having a purity level of 4N (99.99%) to 5N (99.999%), excluding gas components. For example, see page 8, line 26, to page 9, line 3. The "highly pure" iron oxide is used to prepare iron powder which is mixed and heated with Si powder to obtain a synthetic powder containing FeSi as its primary component and that thereafter is mixed and heated with additional Si powder to obtain an iron silicide powder containing $FeSi_2$ as its primary component.

Still further, the present application discloses on page 5, lines 4-7, that, by limiting oxygen content of the iron silicide powder, pulverizing the powder will become easier, and "as a result thereof", the mixture of impurities in the powder will be "reduced". In addition, the present application discloses on page 9, lines 18-23, that:

> "... since the temperature can be increased while suppressing the exothermic reaction (temperature in which the liquid phase will not appear) by performing the synthesis in two stages of FeSi and then $FeSi_2$, a significant effect is yielded in that iron silicide powder having a large specific surface area (grindability is favorable, and the mixture of impurities at the time of pulverization will be reduced) and low oxygen content can be manufactured easily."

Finally, it should be noted that claims 15-17 have been amended to depend from base independent claim 1 via new dependent claim 33 and that claims 23-25 have been amended to depend from base independent claim 2 via new dependent claim 32. Claim 33 requires the iron silicide powder to be $FeSi_X$ powder (where X=1.5 to 2.5) and claim 32 requires the iron silicide powder to contain $FeSi_2$ as its primary component.

For all the reasons discussed above, Applicants respectfully submit that the specification of the present application, as filed, enables one of ordinary skill in that art to make and use the high purity iron silicide powder. As discussed above, this is accomplished by refining the purity of the iron raw material from which a high purity iron oxide and ultimately a high purity iron powder is obtained and by performing synthesis with Si powder in two stages (FeSi and then $FeSi_2$) providing a powder that is easy to grind thereby reducing impurities that are typically added to the powder during pulverization process steps. Accordingly, Applicants respectfully request reconsideration and removal of the §112, first paragraph, rejection of claims 17-19 and 23-25.

III. Claim Rejections – 35 USC §102(b)

In the non-final Office Action dated June 11, 2008, claims 9, 26 and 27 are rejected under 35 USC §102(b) as being anticipated by U.S. Patent No.4,487,627 of Umemura et al.

Independent method claim 9 has been amended to overcome this rejection. Claim 9 has been amended to require production of a fine powder with a high residual ratio of ζ_a phase. No new matter was added; for example, see former claims 15, 16 and 22 and see the present application, as filed, on page 8, lines 6-8, and page 9, line 25.

As readily admitted in the Office Action dated June 1, 2008, Umemura et al. fail to disclose "the crystal structure".

For at least this reason, Applicants respectfully request reconsideration and removal of the above referenced anticipation rejection.

IV. Claim Rejections – 35 USC §103(a)

A. In the non-final Office Action dated June 11, 2008, claims 1, 2, 13-14, 20 and 21 are rejected under 35 USC §103(a) as being obvious over the cited 1959 publication of Booker et al. in view of U.S. Patent No.4,487,627 of Umemura et al..

Independent claim 1 has been amended with the limitations formerly cited in dependent claims 15, 16 and 22, and independent claim 2 has been amended with a similar limitation. No new matter was added; for example, see former claims 15, 16 and 22 and see the present application, as filed, on page 8, lines 6-8, and page 9, line 25.

As readily admitted in the Office Action dated June 1, 2008, Booker et al. and Umemura et al. fail to disclose "the crystal structure".

For at least this reason and for the same reasons that former claims 15, 16 and 22 were not rejected based on this combination, Applicants respectfully request reconsideration and removal of the above referenced obviousness rejection.

B. In the non-final Office Action dated June 11, 2008, claims 15, 16 and 22 are rejected under 35 USC §103(a) as being obvious over the cited 1959 publication of Booker et al. in view of U.S. Patent No.4,487,627 of Umemura et al, and further in view of the cited 1999 publication of Miglierini et al.

Applicants respectfully request reconsideration of the above stated rejection. Applicants respectfully submit that it would not have been obvious at the time the invention was made for one of ordinary skill in the art to arrive at the present invention as now claimed based merely on the teachings of Booker et al., Umemura et al., and the Miglierini et al. publication.

Upon careful consideration of the Booker et al. 1959 publication, it discloses an iron-silicon alloy of a composition including only 3.05 atomic percent of silicon (i.e., an extremely

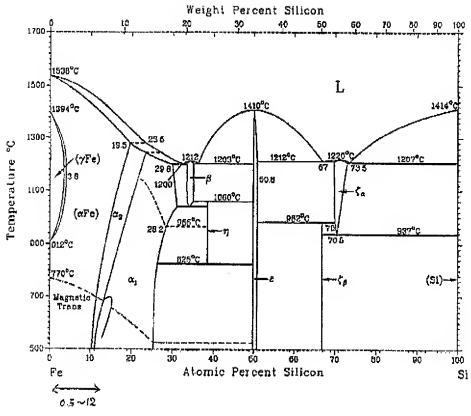
low amount of Si relative to Fe). Further, as readily admitted in the Office Action, Booker et al. fails to disclose iron silicide powder and fails to disclose crystalline structure.

Upon careful consideration of the Umemura et al. patent, it discloses "ferromagnetic metal particles" having only 0.5 to 12 atomic percent of "silicon compounds". For example, the "ferromagnetic" quality of the metal particles is stated in the Umemura et al. patent on: lines 1 and 8 of the Abstract; column 1, lines 11-12 and 16-17; column 2, lines 31-32; and the preamble of each claim. The atomic percent of silicon is stated on column 3, lines 46-47. Also see column 3, lines 52-63, of Umemura et al. which discloses that the amount of silicon compound is preferably 1 to 3 atomic percent, 3 to 5 atomic percent, 8-10 atomic percent, or 10-12 atomic percent. Further, in Table 1 of Umemura et al., the "Amount of Si (atomic %)" (based on the total metal components) is either 3 atomic percent or 10 atomic percent for all examples. Still further, claim 7 of Umemura et al. clearly recite the requirement of 0.5 to 12 atomic percent of silicon compound in the ferromagnetic metal particles.

An Fe-Si phase diagram is provided on the following page. The Fe-Si system (from right to left as shown in the diagram) clearly includes: (a) Si and β-$FeSi_2$ of the semiconductor; (b) α-Fe_2Si_3 of the metal, and (c) Fe_3Si and Fe of the ferromagnetic material.

Booker et al. and Umemura et al. both require the presence of only a relatively small amount of silicon. For example, Booker requires only 3 atomic percent of silicon and Umemura et al. require 0.5 to 12 atomic percent of silicon compound. On the diagram provided on the next page, the 0.5 to 12 atomic percent range is noted on the bottom left of the diagram. Also keep in mind that Umemura et al. clearly refer to the material as a "ferromagnetic" material.

Fe-Si phase diagram



Based on the above information, Booker et al. and Umemura et al. clearly fail to disclose an iron silicide powder having a crystal structure that is substantially a ζ_a phase or that has a primary phase that is a ζ_a phase (as required by claim 1 of the present application), or an iron silicide having a crystal structure that has a high residual ratio of ζ_a phase (as required by claim 2 of the present application). As clearly shown by the above Fe-Si diagram, the ζ_a phase requires a relative high amount of silicon in the Si/Fe ratio; for example, 70 to 73.5 atomic percent silicon (see diagram).

Thus, both Booker et al. and Umemura et al. **teach away** from the present invention required by claims 1 and 2 of the present application because both cited references require only a small amount of Si (no more than 3 or 12 atomic percent) relative to Fe. In addition, Umemura et al. clearly requires a "ferromagnetic" material. Thus, Umemura et al. teaches away from claims 1 and 2 for this additional reason.

"Teaching away" is the antithesis of the art suggesting that the person of ordinary skill in the art go in the claimed direction. Essentially, "teaching away" is a per se demonstration of lack of obviousness. In re Fine, 873 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). In the present case, the references teach 12 atomic percent of silicon or less thereby teaching a ferromagnetic material having no ζ_a phase. (See phase diagram.)

Further, new claim 28 and 32-34 require the iron silicide powder to contain $FeSi_2$ as its primary component or be $FeSi_X$ powder, where X equals 1.5 to 2.5. Based on the small amount of Si required by both Booker et al. and Umemura et al., both references clearly teach away from an iron silicide powder containing $FeSi_2$ as its primary component and teach away from an $FeSi_X$ powder, where X equals 1.5 to 2.5. The claimed powder requires a significantly greater amount of Si relative to Fe and would require the material not to be a ferromagnetic material. Thus, both cited references teach away from the powder of claims 28 and 32-34 of the present application for this additional reason.

Thus, the composition and physical properties of the powder required by claims 1, 2, 28 and 32-34 are neither disclosed by, nor made obvious, based on Booker et al. and the Umemura et al. patent.

The Miglierini et al. publication merely discloses the decomposition (eutectoid) reaction of α-Fe and β-Fe to Si. This decomposition reaction has no relation to the iron silicide powder of

the present invention nor the ferromagnetic materials with low Si content of the Booker et al. and Umemura et al. references. One of skill in the art is taught away from the presence of a high amount of Si relative to Fe by the Booker et al. and Umemura et al. references which are specifically limited to ferromagnetic materials. Thus, there is no common sense reason for one of ordinary skill in the art to combine Miglierini et al. with Booker et al. or the Umemura et al. patent.

In addition, only through an improper hindsight analysis could one of ordinary skill in the art arrive at the present invention as now claimed based on these references. Nothing in these references would lead one of ordinary skill in the art to the claimed powder, its advantages, and method of production, unless one improperly relies on Applicants' own disclosure as a blueprint to piece the unrelated and conflicting prior art references together, which is clearly improper and fundamentally unfair.

Accordingly, Applicants respectfully submit that claims 1 and 2, as amended, and new claims 28 and 32-34 are patentable over the cited combination of Booker et al. (3 at% Si) in view of Umemura et al. (no more than 12 at% Si) and in further view of Miglierini et al. (generally disclosing a decomposition (eutectoid) reaction inconsistent with the disclosures of Booker et al. and Umemura et al. and not related to the present invention).

In addition, Applicants respectfully submit that the production method of the powder of the present invention is different and unobvious relative to the cited prior art.

Umemura et al. describes: (i) obtaining oxide particles by subjecting oxyhydroxide having iron as its principal component to thermal dehydration treatment in an inert gas atmosphere at a temperature of 500°C or less; (ii) applying a relatively small amount of silicon

compound to the oxide particles (see above); and (iii) heating and reducing this in a stream of hydrogen at a temperature of 300 to 550°C to create ferromagnetic particles.

In contrast, the present invention: subjects high purity iron salt solution to drying to obtain an oxide and roasting the oxide to obtain a high purity iron oxide (Fe_2O_3) (see new claims 29-31); reduces the high purity iron oxide with hydrogen to obtain highly pure iron powder; heats the iron powder and Si powder in a non-oxidizing atmosphere to prepare synthetic powder containing FeSi as its primary component; and adds and mixes additional Si powder and heats the mixture in a non-oxidizing atmosphere to produce a iron silicide powder containing $FeSi_2$ as a primary component (claim 28) and having a high residual ratio of ζ_a phase (claim 1, as amended).

These steps and those of new claims 28-31 are clearly not disclosed by the Umemura et al. patent. Booker et al. merely disclose subjecting an iron silicide alloy having 3 atomic percent Si to nitriding treatment, and Miglierini et al. merely disclose a decomposition (eutectoid) reaction. None of the prior art references or their combination would lead one of ordinary skill in the art to the method required by claims 9 and 26-31 of the present application. Accordingly, the method claims are also submitted as being patentable over the Booker et al., Umemura et al. and Miglierini et al. references.

Accordingly, Applicants respectfully request reconsideration and removal of the obviousness rejection of the claims, as amended, of the present application.

V. Conclusion

In view of the above amendments and remarks, Applicants respectfully submit that the rejections have been overcome and that the present application is in condition for allowance. Thus, a favorable action on the merits is therefore requested.

Please charge any deficiency or credit any overpayment for entering this Amendment to our deposit account no. 08-3040.

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